

BANICHUK, N., BARSUK, A., JERONEN, J., TUOVINEN, T., NEITTANMAKI, P. Stability of axially moving materials. Springer Nature, 2019. 481p. ISBN 978-3-030-23802-5.

This book discusses the stability of axially moving materials, which are encountered in process industry applications such as papermaking. A special emphasis is given to analytical and semianalytical approaches. As preliminaries, we consider a variety of problems across mechanics involving bifurcations, allowing to introduce the techniques in a simplified setting. In the main part of the book, the fundamentals of the theory of axially moving materials are presented in a systematic manner, including both elastic and viscoelastic material models, and the connection between the beam and panel models. The issues that arise in formulating boundary conditions specifically for axially moving materials are discussed. Some problems involving axially moving isotropic and orthotropic elastic plates are analyzed. Analytical free-vibration solutions for axially moving strings with and without damping are derived. A simple model for fluid–structure interaction of an axially moving panel is presented in detail. This book is addressed to researchers, industrial specialists and students in the fields of theoretical and applied mechanics, and of applied and computational mathematics.